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# USSR Report

## ENERGY

No. 109

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ELECTRIC POWER

## NEW RAIL-TRANSPORTED DIESEL GENERATORS DESCRIBED

Moscow GUDOK in Russian 9 Jun 82 p 2

[Article by Engineer A. Muchkin: "A Mobile Energy Source"]

[Text] Where there is neither proximity to power systems or stationary sources of current it is possible to find the PE-6 mobile diesel power plants produced by the Bryansk Machine Building Plant Production Association.

"The four-axle railway car specially designed for this purpose," said the chief production engineer at the railway car building plant E. Kochanov, "has been equipped with a diesel generator unit with a capacity of 1,050 kilowatts. It generates electric power with three-phase alternating current with a voltage of 6,300 volts and a frequency of 50 hertz. The unit meets modern requirements made for the best models of similar electrical equipment while the compactness and simplicity of servicing the diesel ensure its operating responsibility."

The power plant can be transported as part of any trains at a speed of up to 100 kilometers per hour. It can be delivered by water to those areas not reached by railroad tracks or at the nearest railroad station removed from the carriage, placed on wooden or metal skids and pulled by a tractor to the destination. It has been "dropped in" by helicopter to sections of the Baykal-Amur Mainline under construction.

Several of the mobile diesel power plants can be connected into a single powerful power unit capable of providing normal activities and operation of an entire town. A group of 15 such plants have been used in building Tynda.

At present, the Bryansk Plant has developed an experimental model of a more powerful mobile diesel power plant called the PE-8.

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## ROLE OF NERYUNGRI POWER PLANT DESCRIBED

Moscow PRAVDA in Russian 10 Jun 82 p 1

[Article by M. Morozov, correspondent of the newspaper SOTSIALISTICHESKAY YAKUTIYA from Neryungri in the Yakut ASSR: "GRES Is Growing"]

> [Text] Construction has started on a 240-meter reinforced concrete smokestack at the Neryungri GRES which will become the power heart of the gigantic Southern Yakut Territorial Production Complex. This responsible job has been entrusted to the collective headed by I. Kosenok from a section of the Spetszhelzobetonstroy [Special Reinforced Concrete Construction] Trust.

The plans for this unusual structure in a zone of high seismicity will have double reinforcing from high-strength steel and a diameter at the base of 35 meters. The first level 2.5 meters high was poured in 24 hours by the brigade of A. Kol'tsov.

The prompt completion of the station also involves the creation of a reservoir with a capacity of 58 million cubic meters. On the small Olongro tayga stream, the laying of the loams in the body of the dam has been accelerated so as to be able to "catch" the spring flood waters. The experience of the construction workers on the first permafrost Vilyuy GES was essential. Here there are many Vilyuy veterans headed by Hero of Socialist Labor A. Novolodskiy.

"At present at the site there are no secondary projects," stated the director of the GRES under construction, D. Bukin. "Three months before beginning operations, and the first power unit should be in operation next year, a chemical water treatment facility should begin operating."

The power of the plant is 630,000 kilowatts. It will also be a heat-generating plant providing heat for the center of the Southern Yakut Territorial-Production Complex, the town of Neryungri. The power generated by the plant will go into the Far Eastern power ring and the coal complex will become the basic consumer of the electric power. Here coal mining is to be carried out by the strip mining method. This is power-intensive production.

At the construction site of the GRES, an intense work pace is maintained around-the-clock. The dates are approaching for completing the projects of the first territorial-production complex in the zone of the Baykal-Amur Mainline. The power construction workers must create a staging area for tapping not only the coal but also the iron ore deposits of Tayezhnyy and Desovskiy which are located nearby. The first thousands of tons of ore have already been dispatched for comprehensive production testing to the metallurgical plants in the Urals and Kuznetsk Basin.

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ELECTRIC POWER

## UPDATE ON BALAKOVSKAYA AES CONSTRUCTION

Moscow PRAVDA in Russian 9 Apr 82 p 1

[Balakovskaya AES Construction Report by A. Vorotnikov, PRAVDA correspondent in the Saratovskaya Oblast': "AES on the Volga - According to the Construction Chart"]

> [Text] An important stage in operations has been completed in the construction of the Balakovskaya AES. Pouring the concrete of the foundation for the first power unit's turbine has just been completed in a record short time. It is also important to note that the record was established in winter and a large part of the concrete had to be layed in the hard frost. The "authors" of this surprising achievement are the teams headed by A. Filatov, V. Tatkov and others.

But how are things in the construction of the plant as a whole? Before answering this question, the head of the Saratovgesstroy Administration, A. Maksakov, pointed out a large piece of paper attached to the wall. There were three colored lines on it. A green one for the plan assignment, a red one for its actual fulfillment and a blue one for the start-up graph. "As you see, we are fulfilling the plan, but unfortunately, we are lagging behind the start-up graph."

We left for the construction site with Maksakov. Passing Balakovo, the vehicle passed onto a wide highway. Finally, we saw the construction site, stretched out on a surface area of 375 hectares. The spot was well chosen: near a transport artery such as the Volga. Yes, and there was as much water as one needed and when the plant is finished, a lot of water will be required for technological purposes. Arrayed alongside were the enterprises of the construction organizations, the administrations of Saratovgesstroy.

The reactor section is the heart of the plant. Its assembly is now underway. There was a lot of work going on here. Already the laying of the base for the first atomic reactor showed that the collective of builders is capable of creatively resolving the most complex of problems. For

instance, the design provided for the driving of 20,000 pilings many meters in length. This operation is not only labor intensive, but requires a lot of time. Local innovators proposed the building of a dense gravel "cushion" in place of the pilings. It is true, the question came up of whether or not such a "cushion" could serve as a reliable base for the future critical structure. Specialists were called in. They painstakingly tested each layer of the base and came to the conclusion: even a reserve of strength had been created. The innovation helped to save 500 tons of reinforcement steel and 3,000 tons of cement. And this was for only one unit, while the AES will have four of them.

An integral process contract is introduced at the building site with considerable success. It will eventually link the entire technological chain: from the combination of industrial enterprises and transport to the building site. A task is formulated: all of the participants in this unique conveyor must be responsible for the final result.

The building of the AES is constantly maintained under the control of the Balakovo city party committee. Party groups and peoples' control posts have been created at the basic structures. Brigades and sectors are competing to reduce the work time involved.

According to the start-up graph, the first unit of the AES must begin operations at the end of 1984. The Balakovo builders will have to accomplish a large volume of work in this time.

Unfortunately, not everything is going smoothly on the main structure. For instance, the builders have serious complaints about the quality of the product of the Number 2 precast reinforced concrete plant. Cracks and chips are encountered in individual slabs of the wall units. As a result, there are difficulties in completing operations related to the chemical protection of the units. The reinforced concrete construction works Number 3 is often behind schedule in filling rush orders. The Balakovo assembly administration of the Volgoenergomontazh Union has a weakly developed base. Because of this, erecting the plant buildings and floor slabs is often delayed. It is important to quickly overcome the delays which are occurring in individual sectors and to help the builders of the AES to better organize their labor.

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ELECTRIC POWER

## HYDROGEN FUEL DEVELOPMENT

Minsk SOVETSKAYA BELORUSSIYA in Russian 9 Apr 82 p 2

[Article by A. Shashkov, chairman of the Committee for Hydrogen Power Engineering and Technology of the presidium of the Belorussian Republic Council for Scientific and Technical Societies and member of the Belorussian SSR Academy of Sciences: "Expensive, but Beneficial"]

[Text] Further development of the national economy will lead to an increase in energy requirements. The BSSR imports more than 70 percent of its energy resources. Therefore, the implementation of a broad program of fuel and electricity conservation is becoming critical. However, today it is no longer possible to substantially conserve these resources by traditional methods, and the problem demands a fundamentally new approach. One approach is to create industries which have wasteless technology, where gaseous hydrogen is used as the main energy carrier. As an energy carrier, hydrogen has universal properties and its consumer value is somewhat higher than electrical current which, with justification, is considered an ideal type of energy.

The problem includes the production of cheap hydrogen and methods for its storage and use in various branches of the national economy. The Institute of Nuclear Power Engineering of the BSSR Academy of Sciences is working on the production of relatively cheap hydrogen on the basis of a new technology along with the Problem Laboratory of Thermochemical and Combined Methods for the Production of Hydrogen from Water of the Belorussian Technological Institute imeni S. M. Kirov. These studies are extremely important in the scientific and practical plane, although ideas are encountered which say that if there is no cheap hydrogen, then there is no reason to speak ab out its wide use.

At the same time, M. Ye. Yeroshov, a holder of the USSR State Prize, indicated in his articles that with the creation of integrated production, the use of even expensive hydrogen, produced by the direct electrolysis of hydrogen, may be economically useful. Then he justified this point of view along with V. I. Trutayev. Both of them are members of the presidium of the Committee for Hydrogen Power Engineering and Technology of the presidium of the Belorussian Republic Council of Scientific and Technical Societies. The problem of the use of hydrogen in the national economy was discussed and analyzed at a meeting of this committee.

Today there are already specific developments in the application and use of hydrogen. Thus, specialists from the State Institute for the Design of Biological Synthesis have drawn a technical and economic justification on the theme of "Biokhimkombinat". In it it is proven that the protein biomass obtained on the basis of hydrogen in integrated production which combines chemical and microbiological processes will become 2-3 times less expensive.

Moreover, profits may be gained in the machine building industry and in a number of other branches of the national economy through the replacement of acetylene welding by welding using hydrogen or oxygen produced through electrolysis of water. The latter method produces a gain of 20-30 kopeks per cubic meter of the replaced acetylene. Hydrogen is also finding wide use in the soldering of metals and is widely used in machine building. This is especially true in light of the fact that our institute has requested the Belorussian State Institute for the Design of Enterprises for the Hydrolysis Industry and Microbiological Synthesis to conduct a design development of a prototype hydrogenator for welding, and this request has found the support of P. G. Khramotsov and a number of specialists from this institute. Outside of the plan of operations, they created blueprints for a generator. Now it is in the construction stage. It is thought that in the future, should positive results be received, it will be necessary to solve the question about the industrial introduction of the innovation on a republic-wide scale. It should be noted that the Scientific Production Association for Powder Metallurgy is also participating in the creation of hydrogen generator prototypes.

Of interest are works of the Elektroset'proyekt Institute, which has begun a technical and economic evaluation of replacing solar oil with hydrogen as a fuel for drying grass meal. Presently hydrogen is 3-4 times more expensive than the corresponding volume (of liberated heat) of solar oil. However, if the oxygen (obtained from water simultaneously with hydrogen) is not discarded during the drying of the grass meal, but is used, for instance, for welding and cutting metals, for damming operations and the like, then such a replacement of solar oil will become economically expedient. Moreover, with the new drying method, high process purity is guaranteed and the requirement for the solar fuel packaging industry and the transport expenditures are eliminated.

An original method for purifying artesian wells is being proposed in the hydraulics office of the Belorussian Polytechnical Institute. The first purification tests using explosion of hydrogen that is produced directly in the well through water electrolysis are being conducted. This method is simpler, safer and more energy efficient than the hydroelectric impact method which is widely used for these purposes.

These are only a few of the examples of the use of hydrogen obtained by the traditional method, electrolysis of water. A number of chemical industries have a great volume of exhaust gases which contain hydrogen. Using this waste hydrogen to produce protein (such an installation is being built in Grodno at the Azot Production Association) or to directly produce electric power in fuel elements produces a direct savings in energy resources.

Using the heat of enterprises' exhaust gases--and special thermoelectric reaction cycles--to produce hydrogen is another possibility. It involves transforming thermal energy into hydrogen energy needed by these same factories.

It should be noted that the Belorussian State Institute for the Design of Enterprises for the Hydrolysis Industry and Microbiological Synthesis, which requires hydrogen as a raw material for producing protein biomass, is now designing the country's first prototype installation for producing hydrogen from water using thermoelectric reaction cycles with exhaust gas heat. This method was proposed and developed in the BSSR.

The cited examples attest to the fact that the broad use of even currently expensive hydrogen produces significant savings and conserves energy reserves. Moreover, the universal qualities of hydrogen justify the belief that a genuine way to significantly save energy reserves has been found.

Today, numerous works for the practical use of hydrogen are being conducted in the republic mainly by enthusiasts on a public basis. Unfortunately, the institutes of the Belorussian Academy of Sciences have for now only organized studies which are related to the development of methods for producing and storing hydrogen without examining questions on expanding its use in the national economy. It is apparent that the time has come to create a republic-wide program to resolve problems of conserving energy resources by using hydrogen.

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ELECTRIC POWER

## POWER SHORTAGES AT FARMS

Moscow SEL'SKAYA ZHIZN' in Russian 21 Apr 82 p 2

[Article by D. Prosekov, Kalinin-Pskov Oblast correspondent: "It Has Been Turned Off Again--Just When Will Reliable Electricity Supply to Rural Consumers be Put in Order?"]

[Text] "In October and November the power was shut off three days a week and there was no electricity at all for 22 days in December. The situation has not improved this year." These words appeared in a SEL'SKAYA ZHIZN correspondent's article from the "Zavet Il'icha" collective farm of the Staritskiy Rayon of the Kalininskaya Oblast by its chairman, A. Logoveyev and the party organization secretary N. Ignatova. "Because of this, the community-owned herd is irregularly supplied with water; the pipes in three pumping stations were burst by frost and the automatic watering system in one of the cow sheds broke down. The feed works and the scraper transporters do not operate. As a result, the collective farm lost a lot of milk and meat. The animal breeders are leaving the farms and some totally leave the village; they are tired of sitting under a kerosene lamp. You can't even watch television or listen to the radio. And goodness knows when we will have reliable power supply."

This is one of the alarm signals from the Staritskiy Rayon. And it is not the first or the only one. SEL'SKAYA ZHIZN' has already written three times about the numerous interruptions in the electricity supply in these regions of the Kalininskaya and the neighboring Novgorodskaya and Pskovskaya Oblasts. But to date there have been no sudden changes for the better. As before, in many villages there are frequent, unplanned and emergency shut-offs of electric energy sources. According to the data from the Staritskiy Rayon power grid (honestly speaking, underestimated data), in the first half of January alone, 27 kdkhozes and sovkhozes were without electric power for a total of 3,150 hours.

It might seem that winter is the root of the problem. But the situation is no better in the summer. The first secretary of the Rzhevskiy Raykom, I. A. Gurov, spoke of this at a session of the oblast council last summer:

"In July the milk complex of the 'Afanosovskiy' sovkhoz was without electricity for five days. The 'Pyatnitskiy' sovkhoz had interrupted power for more than three summer months. At the 'Mirnyy' and 'Glebovskiy' sovkhozes and other farms, 2,500 cows had no water one day in May. It is not the weather which is at fault. The lines break down because of dilapidation. Measures are taken, but we in the villages cannot do everything ourselves."

It is disturbing that the number of unplanned cut offs from electric power sources and the loss borne by this are essentially not being reduced. The feeling is created that the Ministry of Power regards rural electrification as a stepchild and no one is really doing anything about it.

Consider these figures: according to far from complete data, there were more than 1,500 unplanned shutdowns last year in the Kalininskaya Oblast. There were even more in the Pskovskaya Oblast. As G. S. Krivov, the head of the production administration of the Pskovskiy Rayispolkom, reports, there were at least 3,000 recorded in 1981. In the Gdovskiy Rayon alone there were 115 unplanned shutdowns in December. The head engineer of the Novgorodskaya Oblast Agricultural Administration, V. A. Fomin, says that in the past year unplanned electricity shutoffs occurred at 3,652 industrial structures, including 2,130 animal husbandry ones, and kolkhozes.

is true that statement of the USSR Deputy Minister of Power and Electrification Ye. Borisov in his 1980 letter to the SEL'SKAYA ZHIZN' editor that "there were no emergencies in the electric grids related to extended interruptions or major incomplete deliveries of electric power in the Kalininskaya and Pskovskaya Oblasts in 1979 and in the first half of 1980" is incomprehensible. Are the above cited examples included in this category or not? When electric power is not supplied to a village for 15-20 hours or even several days and the production equipment is disrupted, then no matter what terminology or category we think up, it will be no better and the material losses will not be reduced. If a cow is not milked on time, its productivity is reduced. And when several milkings are skipped in a row, the animal may dry out or one will no longer get a lot of milk out of her.

Unfortunately, no one considers the losses. No records are kept of the unplanned or emergency shutoffs in a majority of the farms, in spite of the fact that several years ago the head of the production administration for agriculture of the Kalininskiy Oblispolkom issued a special order.

"Why keep records?" they say in the collective and state farms. "You're only wasting paper. No one will take the responsibility for the shutoff anyway and the loss will not be repaid."

But it would be worth it to strictly punish the guilty. The question about responsibility for the supply of electric power has been raised often in the press and it is time for the power bosses to correct the situation. Today the majority of kolkhozes and sovkhozes are supplied with energy as the so-called third energy category. This means that they may be shut off at any time for an undetermined length. But no one bears the responsibility for this. Is this right?

The emergency unplanned shutoffs are caused primarily by the low reliability of the grids. Rural electrification in its day was intensively conducted; lines were layed through swamps and forests; untreated logs served as supports and substandard wires were suspended with too small sections. Neither was there the proper care of the grids. But the demand for energy grows year by year, and the loads on the lines increase.

And here is the result: in the Pskovskaya Oblast, for example, many distribution grids for agriculture, especially the low voltage ones, are in an extremely poor technical state. Every fifth kilometer of the rural electricity grid with a voltage of 0.4 kilovolts is in emergency condition, and more than 18 percent of the grids require major repair. It is especially unfavorable in the Velikolukskiy, Porkhovskiy and Dedovichskiy Rayons.

In the Kalininenergo administration they say: "The supports for the majority of the lines were placed 20-25 years ago, and they should be replaced on a mass scale. But where are the materials?" And they cite figures such as the following: In 1981 "Kalininenergo" received only half of the designated wooden powerline supports and even fewer treated ones. Two-thirds of the reinforced concrete supports were delivered, and 40 percent of the 10/0.4 kv power transformers.

The Ministry of Power Engineering and the Ministry of Agriculture of the USSR issued joint orders in which they identified specific measures in each field. The only problem is that many of them remain on paper.

The best method for reducing and eliminating emergency shutoffs is preventive maintenance.

"But we are unable, as they say, to patch the holes. Where do you start with the preventive maintenance?" acknowledges the head of the Selizharovskiy Rayon distribution grids, G. Shalayev, "there are no people."

In fact, as a rule, the electric grid organizations are not fully fleshed out with qualified workers. The number of personnel in the units of Kalininenergo is only 74 percent of the standard and in the Rzhevskiy, Staritskiy, Kesovagorskiy and the Molokovskiy Rayons, only 30-45 percent. Of the 40 electricians in the Selizharovskiy Rayon, only 8 are working. The state of affairs with specialists in kolkhozes and sovkhozes is even worse. Less than one-third are staffed with electricians. To date, cadre training for rural power engineering has not been set up in the senior and middle special training institutes or in the trade schools.

Approximately three years ago the USSR Communist Party Central Committee and the USSR Council of Ministers identified measures for the further development of agricultural electrification. In the adopted resolution it was planned, in particular, to increase the responsibility for unplanned and emergency shutoffs of the rural consumers. But this order is being unsatisfactorily fulfilled. Fewer material and technical resources are apportioned than planned, and the construction and reconstruction of electric power lines is going slowly. It is surprising that with such an alarming situation the Kalininselelektrosetstroy trust (subordinate to the Ministry of Power) plans lower volumes for this five-year plan than the collective has previously fulfilled. And it, even in the past, did not operate at full strength.

"We know that the need for construction and reconstruction is great, but the plan is the plan," says the director of the union, A. I. Marveyev, throwing up his hands.

Also alarming is the fact that the deliveries of the needed machines and mechanisms are being interrupted. For instance, it was planned to deliver 50 back-up diesel power plants to the Kalininskaya Oblast in 1981. Not a single one was sent. All-terrain tractors and means for low level mechanization are not delivered in sufficient quantity.

In the majority of kolkhozes and sovkhozes, the power engineering service is unskillfully managed. Kalininskaya Oblast has no electrotechnical personnel in 54 farms or responsible figures for the operation of the power management in 382 farms. As a result, there is no one to whom to report the slightest defect. Today in the oblast farms, there are more than 115,000 electric motors: there is an average of 120 of them on the kolkhozes and 210 on sovkhozes. Selkhozenergo is for now operating timidly. With a shortage of technology, materials and equipment and trained personnel, it would be better not to disperse them in small services. At present, 4-5 organizations of various agencies concern themselves with rural electrical service.

In a word, there are many problems with rural power engineering. But they are being resolved slowly and not in an integrated manner. The state is suffering enormous losses. The moral losses are no less: the moods of thousands of people and their everyday comfort are ruined. It is no secret that people often abandon the village because of this.

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## BRIEFS

NEW TURBINE GENERATOR--The Leningrad Industrial Electric Machine Building Union "Electrosila" imeni S. M. Kirov has recently built a unique turbine generator with a power of 80,000 kilowatts for the Ryazanskaya GRES; it is of high quality and was produced in a record short time--only three months. Similar units were serially produced here long ago, but the new machine is not gas cooled but completely water cooled. No other country has yet built such a machine. The complete water cooling of the unit makes it possible to significantly reduce its specific metal volume, to increase the efficiency, reliability and operational simplicity. All of this makes it possible to more effectively follow the path noted by the 26th CPSU Central Committee Congress: to develop a fuel power complex for the country, saturating it with economical units of increased unit power. "The 'Eight hundred', with full water cooling, is a major step towards machines having a power of 1 to 1.2 million kilowatts and greater, which will operate according to the same principle", says the deputy secretary of the party committee of the association Aleksandr Nikolayevich Yegorov. "The new equipment produced by the electric power workers is always being improved. Just two years ago the builders of the turbine generators assigned themselves the goal of producing 85 percent of the machines with the state sign of quality; this year they pledged to construct 100 percent of the turbine generators with the respected pentagon. The electric machine builders send their product to all the fraternal republics of our country from the banks of the Neva river. This year the turbine generators with the Leningrad brand will be sent to the Kursk, the Kalinin, the Zaporozh'e and the Ignalin AES, to the Cheboksary GES, the Pribaltiysk and the Azerbaydzhan GRES and others. The RSFSR, the Ukraine and Belorussia are major consumers of the electric motors produced by the union. Kazakhstan receives a large number of the electric machines. One of the largest works will enter operation this year at the Karaganda Metallurgic Combine. The electric power builders recently delivered approximately 100 large machines to its rolling mills. [Text] [Moscow KRASNAYA ZVEZDA 14 Mar 82 p 1] 1822

NEW GES IN TBILISI--A new important step in constructing the Khudonskaya GES, which will be second in power after the famous Ingura GES, began with the opening of a bridge over the Ingura river. Equipment and construction materials will be delivered to the structures being built over

the bridge. Among the power plants presently being built in the republic is the Zhinval'skaya GES which, besides the fulfillment of its basic functions, will facilitate the fundamental resolution of the problem of supplying the capital of the republic with potable water, as well as that of the irrigation of more than 20,000 hectares of dry land for three rayons: Dushetskiy, Mtskhetskiy and Gardabanskiy. [Text] [Moscow PRAVDA 25 Apr 82 p 5] 1822

RENOVATION OF THE DNEPR GES--It has been decided to begin reconstructing the DNEPR GES imeni V. I. Lenin. After its completion, the power of the first-born of Soviet power engineering will almost double. Including the No 2 Dnepr GES, the total power of the giant will exceed 2 million kw. [Text] [Moscow PRAVDA 9 Apr 82 p 1] 1822

AN ECONOMICAL TURBINE--A new series of steam turbines with a power of 800 MW are noted for increased economy. The construction of the lead prototype of the machine was completed at the Leningrad Metal Works Association. The first machine is designed for the Permskaya GRES. [Text] [Moscow PRAVDA 9 Apr 82 p 1] 1822

HIGH SPEED TURBINE TESTING COMPLETED--The complex testing of a high speed atomic turbine with a power of 750,000 kw has been completed at the factory imeni Kirov in Khar'kov. Power units with a 1.5 million kw reactor at the Ingalin AES in Lithuania will be equipped with such units in the first stage. The enormous shaft of the new turbine rotates twice as fast as in atomic machines of such a class. To guarantee the reliable operation of the subassemblies, the achievements of metallurgists and highly precise processing of the parts are used. [Text] [SEL'SKAYA ZHIZN' 2 Apr 82 p 1] 1822

GAS COMPLEX--The second stage of the Shurtanskiy Gas Complex in the Kashkadar'inskaya Oblast has begun operation. The new power makes it possible to double fuel extraction and processing. Construction of the complex is continuing. [Text] [EKONOMICHESKAYA GAZETA No 9 Feb 82 p 6] 1822

ZUYEVSKAYA GRES OPERATION--The first current was produced by the new No 2 Zuyevskaya GRES in Donetskiy Oblast. Its design power is 2.4 million kW, eight times greater than the old Zuyevskaya GRES, built 50 years ago, which has served its day. [Text] [EKONOMICHESKAYA GAZETA no 9 Feb 82 p 6] 1822

DONBASSENERGO ASSOCIATION POWER PRODUCTION--Outstripping the timetable, the Donbassenergo Union has completed production of the 10 billion kWh of electric power since the start of the year, having expended almost 30,000 tons of conventional fuel less than last year. Such is the effect of the competition under the motto of "To save a half gram in the production of each kilowatt hour." The movement of conservationists was born at the Uglegorskaya GRES on the day of the opening of the 26th CPSU Party Congress from the rostrom of which it was named as one of the new structures which increased the power of domestic power engineering. After the party congress, the plants of the Donbassenergo Association noticeably increased the delivery of electricity to the Donets Basin, having taken one quarter million tons less coal from the basin than in the previous year. The achieved savings are equal to two months of coal extraction of a large mine. [Text] [EKONOMICHESKAYA GAZETA no 9 Feb 82 p 6] 1822

POWER PLANT CONSTRUCTION--The fourth power unit at the Ekibastuz GRES-1 has been accepted for operation. With its operation, construction has been completed on the first stage of the plant, the designed capacity of which has reached 2 million kilowatts. Here they have already completed the assembly of the fifth power unit with a capacity of 500,000 kilowatts. The electric equipment has been turned over to the final mechanics. Planned electric power output was reached 4 months ahead of time at the Navoi GRES. By the end of the year the plant collective intends to produce around 30 million kilowatt hours of electric power for consumers above the plan. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 24 Jun 82 p 3] 10272

HYDROPOWER CONSTRUCTION--The constructions workers of the Sayano-Shushenskaya GES have begun to pass the fifth flood of the season. The conquerors of the Yenisey have considered all possible emergency situations. Certainly one must always be on guard with the Yenisey. The lessons of the 1979 flood remind one of this when the waters arriving in the reservoir had to be passed over an incomplete dam. In May the inflow into the river was more than 3,000 $m^3$ of water per second and at the beginning of June it again tripled. The plants are not merely to release the water but also make maximum use of it and force it to turn the six Sayan turbines. For this the hydropower construction workers had not only to increase the height of the dam by 180 m but also seal its concrete "shoulders" to the rocky banks so that not a single drop of water soaked through. A dependable partnership with suppliers ensures a steady pace for the construction conveyor line. These suppliers include more than 200 enterprises and organizations. [by G. Kokukhin, TASS correspondent from Sayanogorsk] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 May 82 p 2] 10272

SHATURA PLANT MODERNIZATION--The pioneer of the GOELRO [State Commission for the Electrification of Russia] Plan, the Shatura GRES imeni V. I. Lenin is to receive a powerful central heating turbine the manufacturing of which is to be completed today by the collective of the Leningrad Metallurgical Plant Association. At present the station built at the dawn of electrification will not only produce electric power but also heat. In the 1920's, when construction started in Shatura on the then large regional "electricity factory," the nation still did not have its own power machine building. The equipment for the plant with a total capacity of 48,000 kilowatts was purchased from English, German and Czechoslovak firms. In the 1970's, Leningrad and Khar'kov manufactured turbines and generators for Shatura and these greatly exceeded the capacity of the former units. The plant's potential has exceeded a million kilowatts and it has become an important element in the USSR Unified Power System. Soviet power engineering has come a great distance from the first plants of the GOELRO Plan to the very large electric complexes. In terms of the generating of electric power, our nation presently holds first place in Europe and second in the world. [by S. Davydov] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 9 Apr 82 p 1] 10272

POWER INTERRUPTIONS--This was the name of the article "What Happened at Balakhna?' published in PRAVDA on 20 February 1982. As the editors have been informed by the USSR Deputy Minister for Power and Electrification, Yu. Semenov, the article was discussed by the board and the criticism was judged valid. The ministry has outlined a program for increasing the dependable operation of the Gor'kiy GRES and

for modernizing and reconstructing its equipment. As a result of carrying out the primary measures there has been no instance of shutting down the papermaking equipment at the Balakhna Pulp and Paper Combine due to the lack of steam. The persons guilty of violating the technical operating rules of the power plant and of releasing untreated water into the boilers have been strictly punished. These included: the chief of the production and technical section of the Gor'kiy GRES Yu. Ogolikhin who has been released from his held position and the chief engineer of the GRES V. Tropinin, the chief engineer of Gorenergo [Gor'kiy Power Administration] M. Shchelin and the manager of Gorenergo V. Bitkin who were strictly reprimanded. The Deputy Minister of Railroads V. Gin'ko has stated that as a result of the adopted measures 79 railway cars are dispatched each day with raw materials to the Balakhna Pulp and Paper Combine while the planned level is 75. [Text] [Moscow PRAVDA in Russia 26 May 82 p 3] 10272

TAJIK POWER CONSTRUCTION--The first assemblies of hydropower equipment have begun arriving at the construction site of the prime construction project of the five-year plan, the Baypaza GES in Tajikistan. The Khar'kov Turbine Plant was the first to deliver the inserts for the cone of the suction pipes. An old friendship links the construction workers from the Nurekgesstroy [Nurek GES Construction] Administration with the collective of this enterprise. Again the "worker relay" is in operation. Its threads also extend to Sverdlovsk, Zaporozh'ye and Krasnoyarsk which will also deliver equipment to Baypaza. In order to ensure a high work pace it was decided to conclude a contract for a small "worker relay". Thus, the brigade of concrete workers of Hero of Socialist Labor M. Sharifov is competing with the collective of installation workers of N. Grigor'yev. Both collectives have rich labor traditions. The Sharifov brigade built the Nurek GES from the first cubic meter of concrete to the very end. The installation workers of N. Grigor'yev participated in many construction projects. The "worker relay" is in dependable hands. [by P. Laptev, correspondent of SOTSIALISTICHESKAYA INDUSTRIYA from Dushanbe] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 May 82 p 1] 10272

TRANSMISSION LINE CONSTRUCTION--The supports for the Ust'-Ilimsk GES-Kodar power transmission line have "marched" across the Vitim River from the Buryat to the Chita section of the BAM [Baykal-Amur Mainline]. The collective of the Vostoksibelektroset'stroy [Eastern Siberian Power Grid Construction] Trust is building the 200-kilovolt power transmission line and with its aid the construction workers at the Kodar Tunnel will be provided with a reliable power supply. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 22 May 82 p 3] 10272

EKIBASTUZ POWER LINE--Construction on the 1,150-kilovolt power transmission line is under way along the entire route. This line will link Ekibastuz with the industrial centers of the Urals. The mechanized columns of the Spetsset'stroy [Special Grid Construction] Trust have already set up 1,120 50-meter supports. A little more than 200 supports remain to be installed. The construction workers are trying to equal the leading brigades of the installation workers under V. Arkhipov and P. Klochkov. These have been the initiators of high speed laying of the line. While at the start of the year each of these brigades installed two supports per day, at present it is five and with excellent quality. The substation at Karagay near Kokchetav is being built rapidly. Here the foundations have been readied for the gantries of the distributor equipment and all the basic excavations have been dug. At the same time housing and cultural-service facilities are being built. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 24 Jun 82 p 16] 10272

ESTONIAN POLLUTION PREVENTION--Work has started on laying the foundation for a new smokestack at the Kokhtla-Yarva TETS. Its designed height is 150 m. The putting of the new smokestack into operation will make it possible to significantly reduce air pollution over the city. At the same time designing is underway for installing special electric filters on each of the six boilers. The experience of the Akhtma TETs where such filters have already been installed has shown that air pollution after completion of construction was reduced to a minimum. The degree of removing smokestack wastes in Akhtma is almost 98 percent. As a total for improving the environment in the urban zone, around 11 million rubles have been allocated for building the new insulation at the Kokhtla-Yarva TETs. According to a preliminary estimate the construction work will be completed in 1987. [by V. Sandratskiy] [Text] [Tallinn SOVETSKAYA ESTONIYA in Russian 19 Feb 82 p 1] 10272

POWER PLANT DELAYS--At present one of the important tasks in Ekibastuz is to complete the third stage of the TETs. According to the schedule approved by the gorispolkom for completing the project less than 2 months remains. At the same time the construction workers, upon the admission of the chief engineer from the main contracting administration Energopromstroy [? Power Industry Construction], K. Kopasov, have fallen greatly behind schedule. Instead of 300 men working on the project there are less than 100. Here they lack equipment and transport. Each day they make their plans but specific measures are not adopted. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 24 Jun 82 p 16] 10272

EKIBASTUZ PLANT PROBLEMS--In May at the Ekibastuz GRES-1 they expected to complete the fifth power unit with a capacity of 500,000 kilowatts. The boiler was tested, and preparations were carried out for starting up the equipment of the turbine, but the putting of the turbine unit into operation was held up. The fuel supply system No 2 was not ready and installation had just been started on the equipment for the second smokestack. In a word, there is no feeling of preoperational tension at the project. Suffice it to say that the starting up of the turbine equipment has been delayed nearly due to the fact that the client, the Ekibastuzenergo [Ekibastuz Power] Association (manager, Comrade Moshkin) did not concern itself ahead of time with the delivery of fuel. Only at the end of April did the Ekibastuzenergostroy [Ekibastuz Power Construction] Trust (manager, Comrade Filatov) decide upon the general contractor for certain work. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian 24 Jun 82 p 16] 10272

MINGECHAUR POWER CONSTRUCTION--The first shift of the shock watch by the construction workers of the Azerbaijan GRES was completed. The workers and employees from the Mingechaur PMK-11 [Mobile Mechanized Column] of the Dushanbe Soyuzzhilstroy [USSR Housing Construction] Administration under the USSR Ministry of Power and Electrification assembled for a ceremony where the assignments of new apartments were to be presented for the newly completed 60-apartment 5-story building in the power workers' settlement. On the same day, a 50-apartment multistory building was occupied at No 3 Sabir Street; this was built by funds from the executive committee of the Mingechaur City Soviet. Since the start of the year, the city has provided new housing for 210 worker and employee families. By the end of the year another 482 families will move in. During the jubilee year, Mingechaur intends to build and put into operation new housing with a total area of 27,700 square meters including 26,600 square meters using funds of the municipal soviet executive committee. This will be a fine gift from the construction workers to the city's inhabitants for the holiday of peoples' friendship, the 60th anniversary of the formation of the USSR. [by N. Ismaylov, VYSHKA correspondent, from Mingechaur] [Excerpts] [Baku VYSHKA in Russian 15 May 82 p 4] 10272



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## SIMPLE METHOD DEVISED FOR PUTTING OUT OIL, GAS WELL FIRES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 May 82 p 3

[Article by M. Chetverikov, chief of the Experimental Fire-Fighting Laboratory of the UPO [Fire-Protection Administration] of the Tyumenskaya Oblast Ispolkom UVD [Internal Affairs Administration], and V. Grigor'yev, journalist: "The Attack on Fire"]

[Text] Is it possible to simulate a catastrophe--a burning oil and gas gusher--without visiting the spot and not seeing it with one's own eyes? Don't answer too hastily. It can be done--by means of an ordinary lighter. You snap its mechanism and the gas, on escaping and coming into contact with the spark, bursts into a bright flame. This will be a counterpart of a gusher, reduced 1,000-fold.

It is not difficult now to visualize how, from the far depths of the earth's strata, under a pressure of several hundred atmospheres, an enormous pillar of fire shoots upward, sometimes more than 100 meters high. A burning gusher is a calamity--there are enormous losses, and this violence, which has broken the rocks' control, can be beaten only with the greatest skill and courage.

Comparatively recently, something like 20-25 years ago, there were not in domestic or world practice many well-known specialists in extinguishing gas and oil gushers. A battle (and this word is fully pertinent) with a raging fire lasted for months, and at times longer.

What did they have at their disposal, what methods of extinguishing did the courageous craftsmen have at their command? Primarily, it was an explosion of great force, which swept the flame to the side, broke it into pieces, and freed the well mouth of the flame. Is this a reliable method?

In 1967, not far from Groznyy, a gas and oil gusher blazed up. It was decided to use an explosion. A special lifting crane with a boom reach of more than 20 meters was erected. With its help, a ton of explosive was placed in direct proximity to the well, which was not a simple or safe thing to do. Finally, an explosion was heard--and the gusher continued to blaze.

What was the matter, why didn't the explosion work? It turned out that the shock wave had destroyed the flame, but a scorching cloud formed by the explosion lit the gas and oil mixture again.

A currently existing method that is effective also has been used: the drilling of additional holes. This is a complex matter that requires high skill, precision and, the main thing, much time. A drill rig must be brought in and erected at a distance from the gusher. Then a new shaft is drilled, in order to intercept the "well that has gone berserk" at a given depth. Then it is either covered with a heavy clay mud or it is entirely cemented.

Right now the armament of all large fire departments includes special AGVT's--gas and water extinguishing vehicles. Alas, experience has shown that neither is this a panacea. Indeed, for the operation of just one installation requires many tons of water. And if there is none near at hand?

In October 1980 a gas and oil gusher blazed up at the Fedorovskoye field in Tyumenskaya Oblast. Just to reduce the heat radiation in the area of the fire and to create an environment that was acceptable in the slightest degree for operating fire equipment, an average of 6,000 tons of water was expended per day.

AGVT vehicles were delivered to the stricken facility by helicopter (only one installation can be hauled per flight). When just one of the special machines that had been delivered began to operate, the requirement for water rose still more. In all, in order to extinguish the gusher and to protect fire equipment from heat radiation, about 137,000 cubic meters of water were consumed.

Luckily, not far from there a stream that had not been frozen over yet was flowing, but it also could not meet the requirements in its natural state. And then 1,500 cubic meters of soil were hauled, a temporary dam was built, pump stations installed, and two water lines laid. In order to do this and other preparatory work at the mishap scene, 30 units of various types of equipment were involved: bulldozers, truck tractors, trucks and so on. More than 100 people took part in extinguishing the gusher. And only in 21 days did they succeed in putting out the fire.

And now still another method has appeared, one which IZOBRETATEL' I RATSIONALIZATOR [Inventor and Innovator] (No 8, 1979) described under the heading, "The Invention of the Year." The Higher Engineering Fire-Fighting Equipment School of USSR MVD [Ministry of Internal Affairs] has developed an installation called the SDTF-200, a system for remote extinguishing of gushers. Externally, it is a large grip, which consists of a 10- to 15-meter arm, along which water is fed. A semiring with clamped-on sprayers for streams of water is fastened at the end of the arm. The tractor is supposed to bring this semiring up to the fiery column and then the water-feed system is turned on, putting the gusher out.

The SDTF-200 has many attractive features: the installation is one-twentieth the weight of a jet installation and it consumes little more than 1 percent as much water.

It goes without saying that the proposed system deserves approval, but (alas!) it does not solve all the problems. It is not very easy to control the system in the high heat radiation zone from the tractor. Moreover, the ring itself with the clamped-on sprayers does not always maintain contact with the flame, and some components become deformed. Finally, this installation cannot extinguish a burning "cluster," the spread of which at times exceeds 25 meters.

Scientists of the Hydrodynamics Institute of the USSR Academy of Science's Siberian Division searched for a solution, jointly with specialists of the Fire-Protection Administration of the Novosibirskaya Oblast Ispolkom's UVD. Whereupon workers of the Fire-Protection Administration of Tyumenskaya Oblast Ispolkom's UVD were also actively included in this work.

The Hydrodynamics Institute's Laboratory for Vortex Motion of Liquids and Gases began, at the initiative of Academician M. Lavrent'yev, a detailed study of the nature of vortex flows. The characteristics of vortex formation were discovered as a result of careful experiments. And so, when the scientists, under the supervision of Doctor of Mathematical Physics Sciences B. Lugovtsov, built mathematical models of flows and, by means of them, began to calculate the parameters of vortex rings, the question emerged: can these same rings be put to service in extinguishing gas and oil gushers?

Experiments were begun. First under laboratory conditions, then at a testing ground. It turned out that if a tightly twisted vortex ring is released upwards from the base of a fiery pillar, it snatches the flame and, after tearing it off from the well mouth, raises it upwards. But how to form this aerial shaft?

And that very same "poorly reliable" explosion of the old days is recalled. But now, in order to form a vortex ring, not a ton of explosives but only a few kilograms were needed. It is true that at first there were cases where the flame still penetrated the ring and destroyed it. Therefore, a special flame-extinguishing power was added to the explosives, and, as a result, a reliable method for dealing with gas and oil gushers--called the vortex-power method--was born. Moreover, experience has shown that in the absence of the flame-extinguishing powder, cement can replace it successfully.

The valuableness of the new method consists not only in mobility and a sharp reduction of expenditures but also in much easier execution. It is sufficient to weld or knock together from any handy materials a П-shaped base to one side of the danger zone. Place the explosive and power or cement on it, and then join all this to two cables. Then, going around the flame to the side, hitch these cables on the opposite side to any mobile unit and drag the base to the well mouth. From shelter, contact is made, and the ring formed by the explosion breaks the flame off at the well mouth. And that is all.

Since the year 1977, the new method of extinguishing has passed numerous tests, including tests at the proving ground near Nizhnevartovsk. Recommendations were worked out on which have been placed the signatures of V. M. Titov, deputy director of the Hydrodynamics Institute of the USSR Academy of Sciences' Siberian Division and corresponding member of the AN SSSR [USSR Academy of Sciences] and of A. V. Vyaznikovtsev and N. Ye. Chernukhin, managers of the Fire-Protection Administrations of the Tyumenskaya and Novosibirskaya Oblast Ispolkom UVD's.

But still, not everyone has yet received the full right to use the new method. And indeed, what is surprising is that there are no opponents, every one is for it. For example, the USSR MVD's Main Administration for Fire Protection assessed it highly in a document dated 8 July 1981: "...the effectiveness and simplicity of the new method for extinguishing gushers, development of the scheme for remote delivery of the fire-extinguishing means when extinguishing single or grouped gushers at well clusters, and the methodology for calculating the fire-extinguishing means deserve attention."

But this is the very same Main Administration for Fire Protection which 2 days later, on 10 July that is, proposed in another document, "to coordinate the question of the possibility of conducting tests in 1982 at a Glavtyumenneftegaz [Main Administration of the Oil and Gas Industry of Tyumenskaya Oblast] base of Minneftеprom [Ministry of Petroleum Industry]." It must be understood that the new method can receive its certification at best in a year.

The Tyumen' geologists have calculated that at times up to 100,000 rubles are now being spent on transport expenditures alone for hauling flame-extinguishing means and people just for one fire. And there are incalculable losses from the combustion of valuable raw materials, the construction of various temporary operating structures....

If one adds up all these expenditures and recalls that the new method requires, in all, one suitcase of explosives and two or three people, then is it possible to find justification for protracted tests?

11409
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## DIFFICULT DRILLING CONDITIONS HOLD UP SEARCH FOR MESOZOIC OIL IN AZERBAIJAN

Baku VYSHKA in Russian 21 May 82 p 2

[Article by S. Astvatsaturov, senior scientific worker of AzNIPIneft' [Azerbaijan State Scientific-Research and Design Institute for the Oil Industry]: "Raise Drilling Work Quality"]

[Text] Where should Mesozoic oil be sought?

Extremely important questions connected with prospecting for new oil and gas fields, primarily in Mesozoic deposits, have been discussed in VYSHKA's pages. The authors shared with readers their opinions and complained completely correctly that in recent years geological and geophysical research and prospecting drilling have not yielded appreciable results. Actually, promising Mesozoic fields and Eocene deposits still remain prospecting targets on Azerbaijan's dry land.

It should be considered that, although in carrying out these tasks, large amounts of prospecting drilling have been contemplated, drilling organizations have not, nevertheless, fulfilled the planned indicators for various reasons. Therefore, there are still not sufficient bases today to draw any conclusions or to change previously planned programs for studying the republic's various geological regions.

The opinion of some geologists and geophysicists that apparently a sharp break occurred in folding along the Mesozoic and the Paleogene and there was a substantial increase in the thickness of Paleogene deposits, as if to prevent the discovery of Mesozoic deposits, is not supported as yet by any kind of factual data.

It is known that a large restructuring of folding occurred on Azerbaijan territory in the Tertiary period, at the end of the Miocene, as a result of which its younger layers in the Caspian area and in Gobustan lie with sharp unconformity on more ancient formations, and in the Kirovabad region and the area between the Kura and Iori Rivers the Upper Pliocene lies sharply unconformably on the eroded Maykop and Miocene. Basically, no other large unconformities are observed in relation to the Tertiary and the tops of the Upper Cretaceous. Only in the side portions of depression zones can unconformities between the Paleogene and the Upper Cretaceous (the Amirarkh, Dal'mamedly and others) have local appreciable manifestation.

No sharp changes are observed in the structure of the Maylop and Eocene deposits or within the Maykop strata in Azerbaijan. One can speak only of the strong tectonic

complexity of the area, which is situated along the southeastern periphery of the Greater Caucasus, as a result of which, in some cases, the soft strata of the Maykop suite squeezed out into the dome portion of the structures and the fault zone of certain uplifts.

As for the almost two-fold increase in thickness of the Tertiary deposits in the Central and Southern Gobustan that has been proposed, it should be noted that there are still no factual data of any kind to confirm this opinion, since it has been established that in holes of Nardaran-Suleyman, even where there is a 900-meter thickness of the Eocene and steep dip angles of the well formations, Cretaceous deposits could not be found.

It is more likely the case that the data about the depths of deposition of the Upper Cretaceous were taken just from geophysical data and they proved to be overstated. The facts indicate that in Central Gobustan, the Yevlakh-Agdzhabed depression, the area between the Kura and Iori Rivers, and the Adzhinoura, Upper Cretaceous deposits that are more promising in regard to the presence of oil and gas can be found in their submerged portions basically only at depths of more than 5,000-5,500 meters. This presupposes a need to pay special attention to the technology of the drilling operations, since almost the whole wide zone within the republic that lies between the Greater and the Lesser Caucasus is distinguished by extremely complicated geological structure and difficult conditions for sinking holes. For this reason, prospecting wells often have not been brought down to the designed level. That is why the problem of the Mesozoic and Eocene oil depends greatly upon raising the quality of the drilling operations conducted.

As for the question about searching for Mesozoic oil, then it should be stated that there is an integrated design for exploring the Mesozoic during the 11th Five-Year Plan, which the Ministry of Petroleum Industry has approved. Now it is a matter of drilling over the structures approved by this design, finding and studying promising horizons, and planning ways for conducting further prospecting and exploratory drilling for oil and gas.

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## METHODS FOR DEVELOPING VAST GAS-HYDRATE RESERVES OF NORTH DISCUSSED

Moscow IZVESTIYA in Russian 21 May 82 p 3

[Article by N. Cherskiy, chairman of the Presidium of the Yakutsk Branch of the USSR Academy of Sciences's Siberian Division and academician, and V. Tsarev, manager of the laboratory of the Institute of Physical and Equipment Problems of the North and doctor of geological and mineralogical sciences: "Solid Gas"]

[Text] This is a new type of useful mineral discovered in the earth's crust by Soviet researchers.

The word combination, "solid gas," still sounds unusual, but,possibly, with time, the new fuel will get a new name. We are busy right now with something else--how to put it to the national economy's service.

Just what is "solid gas"? It is gas hydrate, solid compounds of water and natural gas, but in physical composition it is externally something like ice. One cubic meter of such "ice" liberates 160-180 cubic meters of natural gas.

Gas hydrates were obtained under laboratory conditions 180 years ago. A century passed, and when the industrial recovery of gas had begun they called attention to themselves in a most perfidious way. They formed plugs in gas lines and chemical apparatus, they stopped up pipes, and they caused much bother during gas transport over multikilometer arterials.

In the last 30-35 years research has begun to be performed that is aimed at using gas hydrates in various industrial processes--for getting fresh water, for gas storage, and so on. Our country was the first in the world to begin the study of natural gas hydrates as useful minerals. It was found that the geography of solid-gas deposits on the continents coincides practically with the zone of distribution of permafrost. This is a big area--about 40 million square kilometers.

In the USSR there are gas-hydrate deposits in the northwest of the European part and in West and East Siberia. A large portion of the solid gas is concentrated in East Siberia. But the greatest density of deposits is expected in the north of West Siberia.

The seas that wash our country also are rich in gas hydrate deposits. Nature created astonishingly favorable conditions here for accumulating solid gas.

Research results yield a basis for supposing that the natural gas reserves in dry-land gas-hydrate deposits are comparable with the reserves of ordinary gas deposit fields. And in the sediments on the bottom of the World Ocean, the amount of methane that is included in gas-hydrate deposits will surpass severalfold the total resources of all other fuel found on dry land.

And so there is a new type of fuel in nature's storehouse. But how to extract it? A number of operating schemes have been proposed for solving this task. One of them calls for breaking down the producing formation, raising the rock mass to the surface, and extracting the useful mineral. This scheme, which we have developed, is more effective for operating offshore fields that lie at a depth of less than 100 meters from the bottom of the water body.

Another scheme calls for heat interaction on the formation in which the solid gas has been deposited. When heated it "thaws," breaking down into ordinary natural gas and water. And the gas later is extracted on top. In this case, it is possible to use thermal waters, and also production waste heat with a temperature of 30-70 degrees C.

Certain types of deposits in which the pores of the host rocks are filled with free gas, along with the hydrates, can be developed with the methods widely used for operating ordinary gas fields. Among these are gas and gas-hydrate fields. Expenditures for operating them are about the same as for ordinary gas fields. This was indicated for the first time in world experience in the development of the Mossoyakh gas and gas-hydrate field, which is situated in the north of Krasnoyarskiy Kray.

Offshore field development will, of course, be more expensive than on dry land, but in this case the cost of recovering the gas will not exceed the level of world natural-gas prices.

It can be asserted that the development of gas and gas-hydrate fields on dry land is economically justified even today. Therefore, it is necessary to promote interindustry scientific-research and experimental-design work immediately on a broad scale and also to begin to prospect for and explore gas-hydrate fields in West and East Siberia and on the offshore shelves.

And, in conclusion, a few words about other ways to use gas hydrates. They can be used in purifying and desalting natural and industrial waters, for extracting valuable components from aqueous solutions, and for other purposes. A substantial reduction in energy expenditure per unit of final output is an important advantage of gas-hydrate industrial processes in comparison with the methods now widely used.

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## GAS-CONDENSATE FUELS NOT USED FULLY IN FUEL-IMPORTING YAKUTIA

Moscow EKONOMICHESKAYA GAZETA in Russian No 16, Apr 82 p 15

[Article by V. Basonov, chief engineer of Yakutgazprom [Yakutsk Gas Industry Association] and A. Lavrik, lecturer of the Chelyabinsk Polytechnical Institute and candidate of engineering sciences: "Why Do We Bring Firewood into the Forest?"]

[Text] As is known, liquid hydrocarbons which have been named gas condensate are separated out during gas recovery. Also, gasoline and boiler and diesel fuels can be obtained directly from the condensate with relatively uncomplicated technology, directly in the area of recovery.

Yakutgazprom, with the help of the industry's Mingazprom [Ministry of Gas Industry] laboratory at the Chelyabinsk Polytechnical Institute, has developed industrial schemes for obtaining light boiler fuel from gas condensate, unethylated gas-condensate gasoline with an octane number of 76, and wide-fraction gas-condensate fuel for diesel engines.

An installation for processing condensate has been designed and built at the Mastakhskoye field. So far, fewer than 30 cubic meters of raw gas condensate are being processed here per day, and in this case, the output of gasoline is 25 percent, while the remainder is boiler fuel.

What is the quality of this gasoline? Research has established that it possesses a number of advantages over market-grade A-76 automotive gasoline. Fewer scale deposits are formed in the engine from its use. This has a positive effect on the life of an engine and on the reliability of its operation.

The light fraction content, that is, the fraction with increased evaporativity, of gas-condensate gasoline, is especially important for operating equipment in the north and in low-temperature situations: starting is easier, warm-up time is shorter, and the engine has better acceleration.

The boiler fuel obtained from the condensate also has its advantages: it behaves better at low temperatures, gives somewhat greater combustion heat, has reduced ash content, and is less damaging by way of corrosion to the equipment of boilers that operate on this fuel. This simplifies the operation of boilerhouse installations.

Specimens of gas-condensate fuel have also passed laboratory tests.

This year the association plans to expand the output of fuel made from gas condensate. It would seem that the new fuel should find wide demand. Indeed, it is much cheaper than imported fuel, and its quality is even higher. If even a portion of the demand of Yakutia's enterprises for liquid fuel will be satisfied through local resources, that will save the huge sums that are now being spent to deliver gasoline and diesel and boiler fuel to the autonomous republic.

And the problem of realization of gas-condensate product has already arisen before the association. As before, customers are importing fuel over thousands of kilometers, while the development of local production is being hampered because of marketing difficulties. Is this economical? Indeed, given the opportunities that are opened up by processing gas condensate directly at the places of recovery, the exclusive use of imported fuel is the same as bringing firewood into the forest.

It would seem that planning and supplying organizations should look into this problem attentively. Solving it will bring a great saving of fuel and power resources to Yakutia.

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## EARLY WORK AT YAMBURG GAS-CONDENSATE FIELD INCLUDES DOCK CONSTRUCTION

Moscow KRASNAYA ZVEZDA in Russian 23 May 82 p 1

[Interview with G. Zatsenko, chief of the Central Production-Control Service of the Gas-Field Administration of Nadymgazprom, with a KRASNAYA ZVEZDA correspondent: "Yamburg Is Being Started...."]

> [Excerpts] The first landing of construction workers at the unique Yamburg gas-condensate field, which is located beyond the Arctic Circle, was reported in KRASNAYA ZVEZDA on 7 March of this year. And today work on the erection and the development of facilities for the first settlement is going on full blast.
>
> One of the pioneers of Yamburg--chief of the Central Production-Control Service of the Gas-field Administration of Nadymgazprom [Nadym Gas-Industry Association] G. Zatsenko--tells us, at the request of KRASNAYA ZVEZDA's correspondent:

"Gas reserves at the new field are counted in the thousands of billions of cubic meters. Right now this is second to the Urengoy giant, the largest storehouse of 'blue gold' in the world. Its reserves are located on the Tazov Peninsula, in places with an extremely severe climate, in the so-called subarctic latitudes. Temperatures of -60 degrees are not rare here. Under your feet is permafrost. The working conditions and life in these places are, of course, complicated. Especially during the building up of the field's facilities.

"Take a look at the map: our settlement is located not far from the shore of the Ob' Gulf. The most necessary things are now being rushed here by winter roads and air. But for the start of the broad campaign here, thousands of tons of various kinds of freight are needed: machinery, equipment and materials....And these can be sent only by waterways. You see this fine sinuous line on the map? This is the Nyudyamongotoyekopa. You cannot even call it a river. So it is a creek. It heads for the Ob' Gulf but falls into the swamps. We decided to dig through here a 200-meter canal 60 meters wide so barges with freight can approach the settlement. But it is easy to say 'to dig through.' This is the Arctic! The most difficult section--about 140 meters--is an unbroken monolith cemented by the cold, and in hardness it cedes nothing to granite.

"But nevertheless the construction workers are undertaking the operations. Powerful machines along the intended canal are removing hundreds of tons of ice from on top and are baring the soil. Last week, after blasting operations, the excavators and bulldozers undertook to deepen the canal.

"In the settlement a boilerhouse is already in operation, a dining room has been opened, and a store is being readied to accept its first customers. During the summer navigation season the first barges with cargo will come to the dock that is being erected."

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## BRIEFS

HIGH KOMI OIL RECOVERY--Ukhta--The Tebuk Oil Recovery Administration of Komineft' [Komi ASSR Oil Industry Association] has completed the oil recovery plan for the first 5 months of the year. It took about 100,000 tons of fuel above the goal from the ground. This success resulted from the rapid introduction of new wells into operation and the skillful use of the older-well inventory. [By V. Krukovskiy] [Extract] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 May 82 p 1] 11409

TRANSPORTATION FOR URENGOY GEOLOGISTS--Urengoy--The collective of the motor transport enterprise of Urengoyneftegazgeologiya [Urengoy Oil and Gas Geology Association] is successfully hauling freight to the summer camps. More than 35,000 tons of freight, which is above the plan goal, have been hauled over the winter roads that have been cleared. Delivering materials and equipment to the drill rigs ahead of schedule will enable the drillers' work to be supported reliably in the summer, when there are no roads and helicopter is the only transport tie with them. [By G. Raylo, RSFSR Mingeo [Ministry of Geology] Press-Center Correspondent] [Extracts] [Moscow SOTSIALISTICHESKAYA GAZETA in Russian 29 May 82 p 1] 11409

UZBEK PNEUMATIC-DRIVE PUMP--Uzbek SSR--Specialists of the Andizhan Design-Development Office of Soyuznefteavtomatika [All-Union Association for Oil-Industry Automation] have built a pneumatic-drive pump for creating a pressure differential in a hydraulic system. Existing direct-action pumps and pumps with gate-valve switching gear are complicated in manufacture. The basic excellence of the Andizhan innovation is that here the switching gear has been chosen on the basis of pneumatic automation elements and is a generator of pneumatic impulses. This greatly simplifies design of the pump and the reliability of its operation under any conditions. The pneumatic-drive pump is recommended for use in various branches of industry--the oil, gas and petrochemical industries. [By V. Zhuravskiy] [Text] [Baku VYSHKA in Russian 21 May 82 p 2] 11409

EAST TURKMEN GAS REGION--A new gas-bearing region has been opened up in eastern Turkmenistan. Gas has been obtained at a depth of about 3 kilometers from the promising Malay area. This is the second field developed in the Karakumy since the start of the 11th Five-Year Plan. "The Main Directions for Economic and Social Development of the USSR" planned that recovery of the valuable fuel would be brought up to 81-83 billion cubic meters within the republic during the 11th Five-Year Plan. This will be achieved basically through the development of new fields, particularly the mightiest in Central Asia--the Daulet-Abad. By the end of this five-year plan this field will yield up to 22 billion cubic meters of gas. Its role will be all the more importance since the new field's reserves will gradually

compensate for the natural reduction of the "blue fuel" at Shatlyk. Right now Turkmenistan is producing every sixth cubic meter of gas recovered in the USSR. Karakumy gas is going to the European portion of the USSR over the Central Asia-Central Economic Region gas pipeline. Uzbekistan and Kazakhstan are receiving it. [By Turkmeninform] [Excerpts] [Ashkhabad TURKMENSKAYA ISKRA in Russian 21 May p 2] 11409

AZERBAIJAN OIL WELL RESTORED--Ali-Bayramli--The oil gusher at well No 130, which had been drilled into the pay at the Muradkhanli field, struck again after a short interruption. Its daily flow rate, according to preliminary data, was much more than before, amounting to several hundred tons. As is known, at the start of April water had suddenly encroached at No 130. As the geologists assert, this was a regular phenomenon for Muradkhanly. In order to restore the well, Ali-Bayramli drillers carried out complicated technological operations at a high quality level. The brigade of testers under foreman R. Bakhshiyev and A. Akhmedov labored well. Under exceptionally dangerous conditions, the drill pipe was unscrewed and the well mouth was equipped with a tubing head. In order to prevent ignition of the crude, the operation was performed without any welding. Tubing was lowered into the well to a depth of 2,500 meters, and the well-completion process was started. With regular application of force, a powerful oil-gusher struck from No 130, as if it were in a rage. The testers, especially drillers G. Agayev and A. Bayramov, geologist I. Imanov, chief engineer of the Ali-Bayramli Drilling Administration R. Veliyev and others, acted with precision and coordination. Their efforts managed to prevent an uncontrolled flow. The powerful stream of fuel was guided into the steel channel of an oil pipeline. "No 130," says chief of the technological section of Azneft' [Azerbaijan Oil Production Association] Kh. Mirzoyev, who participated in its completion, "is the most productive in the history of the Muradkhanly field. It has once more confirmed the high promise of this area and simultaneously revealed some peculiarities of its formations." [By S. Garayev] [Excerpt] [Baku VYSHKA in Russian 14 May 82 p 1] 11409

BUZACHI DERRICK-BUILDING SPEEDED--Shevchenko--The drillers had to help the derrick erectors in order to speed up the date that the wells at the Karazhanbas oilfield on the Buzachi Peninsula in Western Kazakhstan are converted to operational status. An original technology for assembling drill rigs, using slip-into-place modules, was proposed. Usually, when transferring to a new penetration point, the drill rigs are transported by separate pieces. The workers decided to arrange the equipment in large modules, and, in passing, they fabricated an additional module for the slush pump. This most labor-intensive portion of the installation is erected ahead of time at the site of the future well. All the utilities and service lines are brought up to it. Now it is sufficient to haul here the drill rig, which completes the operation, and in 3 hours the bit is turning again, dipping deeper into the rock. [Text] [Baku VYSHKA in Russian 8 May 82 p 1] 11409

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## COUNCIL OF MINISTERS PUBLISHES PIPELINE PROTECTION RULES

Moscow SOBRANIYE POSTANOVLENIY PRAVITEL'STVA SOYUZA SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK in Russian No 4, 1982 pp 74-82

[Decree No 20 of the USSR Council of Ministers on Problems Associated with Protecting Main Pipelines Transporting Liquid Ammonium]

[Text] The USSR Council of Ministers hereby resolves:

To extend, to main pipelines transporting liquid ammonium, the Rules Governing the Protection of Main Pipelines approved by decree No 341 of the USSR Council of Ministers, 12 April 1979 (SP SSSR, No 13, 1979, Article 85) and published in revised form (attached).

Chairman of the USSR Council of Ministers
N. Tikhonov

USSR Council of Ministers Business Manager
M. Smirtyukov

Moscow, The Kremlin. 24 December 1981, No 1214.

Approved by Decree No 341 of the USSR Council of Ministers, 12 April 1979 (in the wording of USSR Council of Ministers decree No 1214, 24 December 1981)

### Rules Governing the Protection of Main Pipelines

1. The rules below are introduced with the purposes of ensuring the integrity of main pipelines (including oilfield and inter-oilfield pipelines and collecting mains) transporting petroleum and petroleum products, natural and artificial hydrocarbon gases, condensates, liquefied hydrocarbon gases, liquid ammonium, unstable gasoline and condensate and other liquefied hydrocarbons, of creating normal conditions for the operation of these pipelines and of preventing accidents on them.

2. Main pipelines* to which these rules apply include:

a pipeline together with its branches and loops, shut-off fittings, crossings over natural and manmade obstacles, pumping and compressor stations, connecting units, treatment plant outlet and intake units, gas consumption measuring units, condensate collectors and methanol injection devices;

devices offering electrochemical protection to pipelines against corrosion, operational communication lines and structures, pipeline remote control resources;

power transmission lines, power supply facilities, remote shut-off fitting control units and devices offering electrochemical protection to pipelines;

firefighting resources, antierosion and protective structures of pipelines;

containers for the storage and degassing of condensate, earthen reservoirs to contain accidental spills of petroleum, petroleum products, condensate and liquefied hydrocarbons;

structures of the pipeline operating service;

permanent roads, helicopter pads located along the pipeline route and approaches to them, and pipeline identification and location warning signs;

main and intermediate transfer and inlet pumping stations, tank parts and compressor and gas distribution stations;

above-ground gas storage stations; onloading and offloading platforms and moorings;

petroleum and petroleum products heating points;

liquid ammonium distribution stations.

3. Pipeline routes are marked by reinforced concrete or wooden identification signs (bearing inscriptions) mounted 1.5-2 meters above the ground.

4. Places where pipelines cross navigable and log-rafting rivers and canals are marked on the banks by warning signs in accordance with the USSR Regulations on Inland Water Transport. Warning signs are installed by the enterprise (organization) operating the pipelines, on coordination with the basin waterway administrations (canal administrations), and their locations are entered by these administrations into the shipping situation list and into navigational charts; the routes of marine pipelines are indicated in the Notices to Mariners, and they are applied to marine charts.

5. In places where pipelines cross motor highways of all categories, the appropriate road sign prohibiting the parking of transportation is installed.

6. Information on the actual location of the pipeline (the builder's survey), drawn up in the established order by the construction and installation organization and

*Referred to subsequently as "pipelines".

the client, must be submitted to the executive committees of the rayon (city) soviets of people's deputies so that this information could be applied to regional land use maps.

The executive committees of the rayon (city) soviets of people's deputies issue information on the location of the pipeline to interested enterprises, organizations and institutions.

7. To ensure normal operating conditions and to exclude the possibility of damage to pipelines (however they are laid), protection zones are established:

along pipeline routes--in the form of land areas delimited by conditional lines extending parallel to and 50 meters from the axis of the pipeline in both directions; on agricultural land the protection zone is delimited by conditional lines parallel to and 25 meters away from the pipeline axis in each direction;

along the routes of multiple pipelines--in the form of a land area delimited by conditional lines parallel to and extending 50 meters from the axis of the outer pipelines in each direction; on agricultural land the protection zone is delimited by conditional lines parallel to and extending 25 meters from the axis of the outermost pipelines in each direction;

along underwater crossings of pipelines transporting liquid ammonium--in the form of a water area extending from the water surface to the bottom and contained between parallel planes located a certain distance from the axis of the outermost pipelines set in each concrete case depending on the local conditions by the ministry or department operating the pipeline, on coordination with the USSR Gosstroy and the USSR Ministry of Land Reclamation and Water Resources; for pipelines transporting other products this area takes the form of the water area from the surface of the water to the bottom enclosed between parallel planes located 100 meters away from the axis of the outermost pipelines on each side;

around containers for the storage and degassing of condensate and earthen reservoirs for accidental spills of petroleum, petroleum products, condensate and liquefied hydrocarbons--in the form of a land area delimited by an unbroken line extending 50 meters in all directions from the boundaries of the territories of such facilities;

around main and intermediate transfer and onloading pumping stations, tank parks, compressor and gas distribution stations, gas consumption measuring units, onloading and offloading platforms, underground gas storage stations, petroleum and petroleum product heating points and liquid ammonium distribution stations--in the form of a land area delimited by an unbroken line extending 100 meters in all directions from the boundaries of the territories of these facilities.

8. Land areas designated pipeline protection zones are not confiscated from land users, and they are utilized by the latter for agricultural and other operations, with mandatory observation of the requirements of these rules.

9. Land users intending to conduct field agricultural operations in pipeline protection zones must provide prior notification to the enterprise (organization) operating the pipeline that harvesting and planting operations are to begin.

10. On irrigated land located within pipeline protection zones, operations associated with temporary flooding of land are conducted as agreed upon by the land user and the enterprise (organization) operating the pipeline.

11. The following are prohibited in pipeline protection zones without the written consent of the enterprises (organizations) operating the pipelines:

a) erection of any building or structure;

b) the planting of all species of trees and shrubs, storage of feed, fertilizer and materials, the stacking of hay and straw, the location of picket lines, the maintenance of cattle, creation of fishing grounds, fishing, the taking of aquatic animals and plants, installation of watering sites and the cutting and procurement of ice;

c) erection of vehicle crossings over pipeline routes, installation of parking areas for motor transport, tractors and machinery, and the location of collective orchards and vegetable gardens;

d) the conduct of land reclamation operations and erection of irrigating and water drainage systems;

e) all earth-moving, construction, installation, blasting and earth leveling operations;

f) the conduct of geological surveying, exploratory, geodesic and other investigative operations involving the drilling of wells and bore pits and the taking of earth samples (with the exception of soil samples).

Enterprises and organizations receiving written consent to conduct such operations in pipeline protection zones are obligated to perform them in compliance with conditions ensuring preservation of the pipelines. The conditions for operations conducted within pipeline protection zones are established by the ministry or department to which the enterprise (organization) operating the pipelines belongs (when construction work is involved, the consent of the USSR Gosstroy is required).

Written consent for blasting operations in pipeline protection zones is given only after the appropriate materials foreseen by the Unified Rules of Blasting Operation Safety approved by the USSR State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, are furnished by the enterprise (organization) performing these operations.

12. In the case where it is established that the technical condition of the pipeline requires the performance of repairs with the purpose of preventing possible damage, the enterprise (organization) operating the pipeline has the right to temporarily limit (until such time that repairs are completed), after first notifying the land users, the conduct of operations indicated in paragraphs 9, 10 and 11 of these rules, within the limits of the segment (facility) of the pipeline requiring repair. The dimensions of such an area are equivalent to the minimum distances from the axis of the pipeline (from its facilities) to cities and other population centers, as established by the appropriate construction norms and by the rules of planning main

pipelines approved by the USSR Gosstroy, and by the rules of planning and erecting main pipelines to transport liquid ammonium, approved by the appropriate ministries and departments of the USSR on coordination with the USSR Gosstroy.

For multiple pipelines, these distances are determined from the axis of the outermost pipelines.

13. All actions which may disturb the normal operation of pipelines or cause their damage are prohibited within pipeline protection zones, and particularly:

a) moving, burying and damaging identification and warning signs and monitoring-and-measuring stations;

b) opening hatches, gates, and doors to unmanned cable communication amplifying stations, enclosures of line equipment units, cathode and drain protection stations, line and inspection shafts and other line units, opening and closing valves and slides, and turning communication resources, power supplies and pipeline remote control equipment on or off;

c) all dumping and disposal of acid, salt and alkaline solutions;

d) tampering with river bank stabilizing structures, water flow control devices, earthen and other structures (devices) protecting pipelines from destruction and the adjacent territory and surrounding locale from accidental spills of the transported product;

e) dropping anchor, traveling with lowered anchors, chains, logs, tuck nets and trawls, and conducting channel deepening and dredging operations;

f) starting fires and installing any sort of uncovered or covered fire sources.

14. Within the limits of the distances from pipelines and their facilities indicated in Paragraph 12 of these rules, all measures connected with the gathering of people not engaged in operations for which permission is obtained in the established order are prohibited.

15. The following are permitted for enterprises (organizations) operating pipelines:

a) travel of motor transport and other equipment to the pipeline and its facilities for maintenance and repairs in accordance with traffic patterns agreed upon by the land user and the agricultural administration of the executive committee of the rayon (city) soviet of people's deputies.

If pipelines are located in the territory of preserves and special objects, the appropriate organizations must issue passes to workers servicing these pipelines for the purposes of making inspections and repairs at any time of the day;

b) the digging of bore pits within the limits of a protected zone for the purposes of checking the quality of pipeline insulation and the condition of electrochemical corrosion protection, and the conduct of other earthmoving operations necessary to support normal operation of pipelines, with prior notification of the land user concerning such work (not less than 5 days before the work begins).

c) removal of trees in support of measures to clean up after accidents on pipelines passing through forests, followed by appropriate drafting of logging records and removal of logging wastes from areas of logging.

When necessary, pipeline operating enterprises (organizations) may fell trees in pipeline protection zones in the course of routine maintenance, followed by the drafting of logging records. Wood obtained in this fashion will be used by the indicated enterprises (organizations) to satisfy their own needs, and wood they do not utilize is to be transferred to forestry enterprises to be put up for sale in the established order.

16. In order to permit overhauls and reconstruction of pipelines and to erect crossings over them, pipeline operating enterprises (organizations) must be permitted temporary use, in the established order, of land areas of a size foreseen by the existing norms of allocating land for pipeline construction.

Repairs on pipelines passing through commercial fishing basins must be coordinated with local fish protection organs, except for operations elicited by an emergency situation on the pipeline.

17. When a pipeline protection zone overlaps with a railroad or motor highway right-of-way or with the protection zones of electric power transmission lines and other objects, operations associated with the use of these objects on overlapping portions of territory must be performed with the mutual consent of the interested parties.

18. When pipeline routes pass through state forest land, pipeline operating enterprises (organizations) must provide telephone or radio communication between the pipeline routes and the forestry service.

19. Civilians discovering damage to a pipeline or the leakage of a transported product are obligated to immediately report this to the pipeline operating enterprise (organization) or the executive committee of the local soviet of people's deputies.

20. In the event of an accident on a pipeline, the pipeline operating enterprise (organization) must take immediate measures to correct the problem, and simultaneously inform the executive committees of local soviets of peoples deputies and enterprises (organizations) located in the territory on which the accident occurred.

21. After performing planned or emergency repair and reconstruction operations on pipelines, pipeline operating enterprises (organizations) are obligated to compensate land users for losses caused by these operations, and to return land in the vicinity of the operations to a condition suitable for further use as intended.

Losses to land users are determined in the order foreseen by Decree No 636 of the USSR Council of Ministers, 9 August 1974, "On Compensating for Losses to Land Users and the Loss of Agricultural Production Due to Confiscation of Land for State or Public Needs" (SP SSSR, No 17, 1974, Article 97).

22. Operations conducted to repair damage to pipelines and involving the removal of road pavement are performed by the manpower and resources of the pipeline operating enterprises (organizations) following coordination with the appropriate road maintenance and construction organs.

With the consent of road construction and maintenance organs, damage to roads may be corrected by these organs at the expense of the pipeline operating enterprises (organizations).

23. Residential complexes (population centers), industrial and agricultural enterprises, separately standing buildings and structures (residential and nonresidential) may be erected near pipelines, on the condition that the minimum distances from the axis of a pipeline (or its facilities) to the structures are observed, as foreseen by the appropriate construction norms and rules of planning main pipelines, approved by the USSR Gosstroy, and by the rules of planning and building main pipelines for transportation of liquid ammonium, approved by the appropriate ministries and departments of the USSR on coordination with the USSR Gosstroy.

When the appropriate organs examine petitions to use land for these purposes, the locations of the objects of construction must first be coordinated with pipeline operating enterprises (organizations).

24. A pipeline operating enterprise (organization) and organs of the Gosgaznadzor [not further identified] and the State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision have, within their competency, the right to halt operations performed in violation of the requirements of these rules within a pipeline protection zone and within the limits of distances equal to the minimum distance from the axis of the pipeline (from its facilities) to cities and other population centers established by the appropriate construction norms and rules for the planning of main pipelines, approved by the USSR Gosstroy, and by the rules of planning and building main pipelines for transportation of liquid ammonium approved by the appropriate ministries and departments of the USSR on coordination with the USSR Gosstroy.

25. Pipelines themselves are serviced and protected by linemen employed by the pipeline operating enterprises (organizations).

26. The executive committees of local soviets of people's deputies and organs of the USSR Ministry of Foreign Affairs are obligated, within the limits of their competency, to render maximum cooperation to pipeline operating enterprises (organizations) in ensuring that all institutions, organizations, enterprises and citizens satisfy the requirements of these rules, and in rendering assistance in accident control and recovery on pipelines.

27. Officials and citizens guilty of violating the requirements of these rules are to be punished in the established order.

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August 12, 1982